

# MAGNAVOX

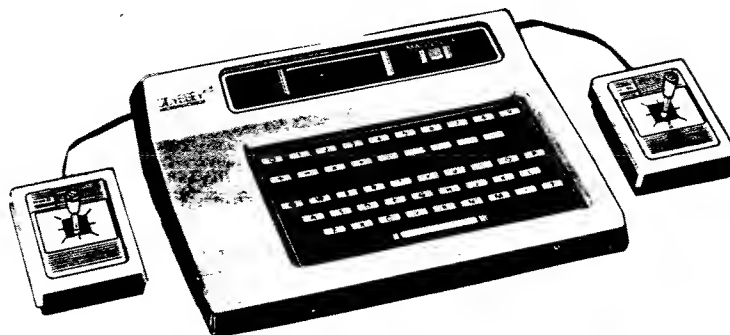
## SERVICE MANUAL

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SERVICE DEPARTMENT/MAGNAVOX CONSUMER ELECTRONICS COMPANY  
FORT WAYNE, INDIANA 46804

### ODYSSEY<sup>2</sup> (BJ/BK7600) VIDEO GAME SYSTEM



Model BJ/BK7600

### GENERAL INFORMATION

The Odyssey<sup>2</sup> (Model BJ/BK7600) is a programmable video game system using integrated circuits. The basic Odyssey<sup>2</sup> system consists of two plug-in Player Hand Controls, a

alpha-numeric Keyboard, Antenna/Game Switch Box, external AC Adapter, and a Game Cartridge.

### INSTALLATION INSTRUCTIONS

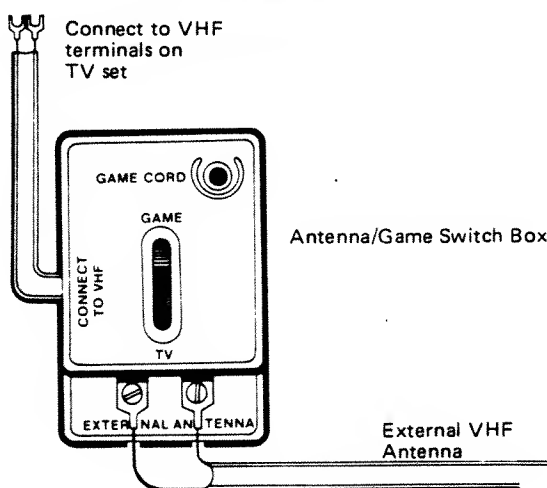


Figure 1

Your Odyssey<sup>2</sup> will interconnect with any color or black and white television set. All you need is a flat-head screw-driver.)

1. The Antenna/Game Switch Box (see Figure 1) is provided as a convenience to allow selection of either Odyssey<sup>2</sup> or regular television viewing, without having to disturb antenna connections.

Locate the VHF antenna terminals on the back of the television set. Disconnect the VHF antenna leads

and reconnect these leads to the terminals on the Antenna/Game Switch box.

Connect the flat twin-lead wire from the Antenna/Game Switch box to the VHF terminals on the back of your television set.

If your VHF antenna cable is round with a screw-type connector (75 ohm), you will need to purchase a 75 ohm to 300 ohm Balun to permit connection of your TV antenna to the Odyssey<sup>2</sup> Antenna/Game Switch box.

If you are using a 75 ohm round cable, your TV will probably have a set of jumper plates or a switch which must be moved to select the VHF 300 ohm terminals. (See your TV's Owner's Manual for information).

If you have only a UHF antenna, do not disconnect it from your television set. Just connect the flat twin-lead wire from the Antenna/Game switch box to the VHF terminals on the back of your television set.

Use the plastic mounting hook supplied to hang the Antenna/Game Switch box from the back of your television set. First insert the hook in the back of the switch box, then insert the end through one of the ventilating holes on the back of your TV.

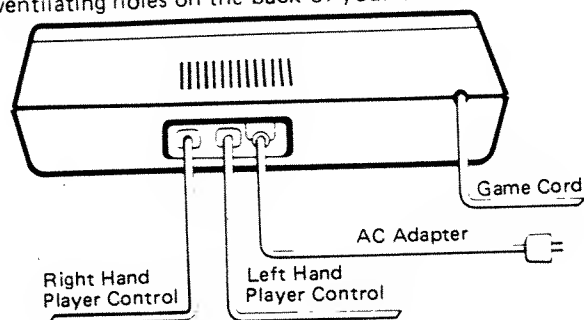


Figure 2

2. Plug the Left and Right Player Hand Control Cables into the rear of the console (see Figure 2).
3. Plug the GAME CORD from the console into the socket on the top of the Antenna/Game Switch box marked "GAME CORD".

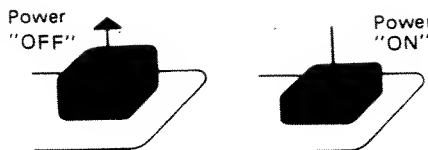


Figure 3

4. Check to make sure that the POWER button on the console is on the OFF position (see Figure 3).

Plug the AC ADAPTOR into any standard 120 volt electrical outlet.

5. Place the switch on the Antenna/Game switch box to the GAME position.

Set the channel of your TV set to the unused channel (3 or 4) in your area.

Your Odyssey<sup>2</sup> is normally set at the factory for operation on channel 3 of your television set. If a TV station is transmitting on channel 3 in your area, you can switch your Odyssey<sup>2</sup> to channel 4 for operation.

This can be accomplished by turning the console over with the cartridge slot facing away from you. Remove the three screws from the bottom of the Console.

Carefully remove the bottom panel of the Console. You will find the channel selector switch in a metal box located to the upper right of the printed circuit at the upper right hand corner of the console. Slide the switch from the channel 3 position to the channel 4 position. Then replace and secure the bottom panel of the Console.

## CHECKOUT PROCEDURE

1. Visually inspect the Console Unit, Player Hand Control Units, and the AC Adaptor for breakage, cracks, broken or bent connector pins, broken wires, foreign material, corrosion or other damage.

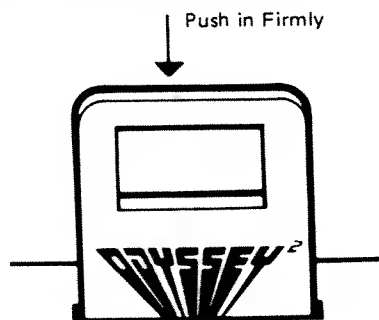


Figure 4

2. Make sure that the Power button on the console is in the OFF position. This will protect the electronic components of both the console and the cartridge.

Hold the Odyssey<sup>2</sup> Cartridge so that the label side is facing you and reads right side up. (See Figure 4).

Insert the Cartridge carefully in the cartridge slot on the top of the console. (Note: When you remove the

Cartridge, always make sure that the Power button on the Console is in the OFF position.)

3. Press the Power button on the console to the ON position.

"SELECT GAME" will appear on your TV screen. If it should not appear, press the Reset Key on the Console Keyboard. If "SELECT GAME" still does not appear on the screen, check to make sure the AC Adaptor jack is completely plugged into the console and that the cartridge being used is properly inserted.

The sounds of the game will be coming from the speaker on your TV. Adjust your volume control on the TV to a comfortable level.

If necessary, adjust the fine tuning control on your TV to get the best possible picture.

See the Official Game Rules booklet that accompanies each cartridge for specific game instructions.

(NOTE: When you want to return to regular TV programming, push the Power Button of the console to the OFF position and place the switch on the Antenna/Game switch box to the TV position.

## SERVICE ADJUSTMENTS

**CAUTION: UNDER NO CIRCUMSTANCES ATTEMPT TO MAKE ADJUSTMENTS OF THE RF OSCILLATOR LOCATED INSIDE THE METAL SHIELD. THESE ARE PRESET AT THE FACTORY IN TEST FIXTURES TO MAGNAVOX STANDARDS, AND STRICT FCC REQUIREMENTS.**

**BEFORE ATTEMPTING TO MAKE ANY SERVICE ADJUSTMENTS, CHECK ENTIRE BOARD FOR SHORTS OR CRACKS. TOTAL CURRENT DRAIN SHOULD BE MONITORED AT ALL TIMES.**

**THE 3.58 MHz CLOCK, MICROPROCESSOR CLOCK AND THE VIDEO LEVEL ADJUSTMENTS MAY BE MADE ONLY AFTER IT HAS BEEN DETERMINED THAT IT IS ABSOLUTELY ESSENTIAL.**

3.58 MHz Clock Adjustment

Connect a high impedance counter to Pin 1 of IC5 and adjust trimmer C6 for  $3,579,545 \pm 50$  Hz.

Microprocessor Clock Adjustment

Connect a scope to Pin 2 of IC7 and adjust L2 for maximum amplitude and symmetry.

(NOTE: This adjustment must be made after the 3.58 MHz Clock Adjustment is made).

Video Level Adjustment

Adjust the Video Level control, R4, until a good contrast in the picture is obtained.

## IMPORTANT SAFEGUARDS

- DO NOT remove or insert cartridges unless the console is turned OFF.
- Guide the cartridges into the cartridge slot of the console. DO NOT use force.
- Clean exterior parts of the console and cartridges with a soft, slightly damp cloth. DO NOT immerse them into water or spill liquids on them.
- Keep the console, cartridges and Player Hand Controls away from extreme heat.
- Avoid puncturing the keyboard. DO NOT use pencils, penpoints or other sharp objects to press keys.
- Always place the Power button of the console in the OFF position when not in use.
- Only connect the console to a standard AC electrical outlet.
- Always turn OFF your Odyssey<sup>2</sup> each time you have finished playing the games. Then unplug the AC Adaptor from the 120 volt outlet.

(Note: If you leave the same game pattern on your TV screen for more than 6-8 hours continuously, there is a possibility that the game pattern could be permanently imprinted on the picture tube screen.)

ODYSSEY<sup>2</sup> TROUBLESHOOTINGNo Game Image on TV

- a. Check the Antenna/Game switch to see if the switch is set in the Game position.
- b. Check to see that the Game Cord is plugged into the Antenna/Game switch box.
- c. Check the connections of the Antenna/Game switch box to the VHF terminals in back of the TV.
- d. The Cartridge may have been inserted when the console was turned On. Place the Power button in the OFF position.
- e. Interference may be caused by a particularly strong broadcast or cable TV station in your area. Disconnect the antenna or cable wire from the Antenna/Game Switch box.

No TV Program Reception

- a. Check the Antenna/Game switch to see if the switch is set in the TV position.
- b. Check the antenna connections to the Antenna/Game Switch box.

Game Image Weak or Blurry

- a. Check for poor connections at the antenna terminals of the TV set and the Antenna/Game switch box.
- b. Be sure the fine tuning control of the TV is properly adjusted.
- c. Interference may be caused by a particularly strong broadcast of cable station in your vicinity. Disconnect the antenna or cable wire from the Antenna/Game switch box.

No Game Sounds

- a. Check the volume setting of your TV.

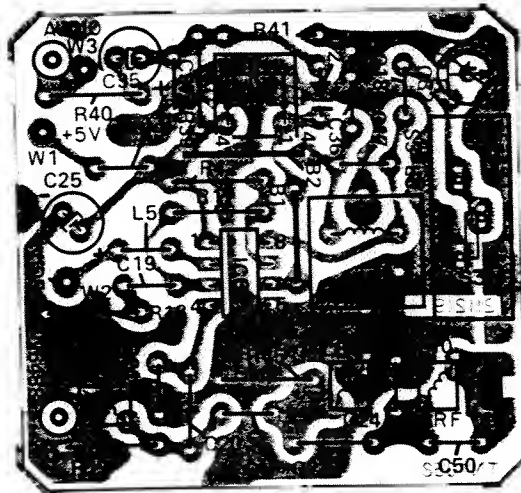
Right or Left Side of Game Area Does Not Appear on Screen

- a. Adjust the Horizontal Hold control on your TV.

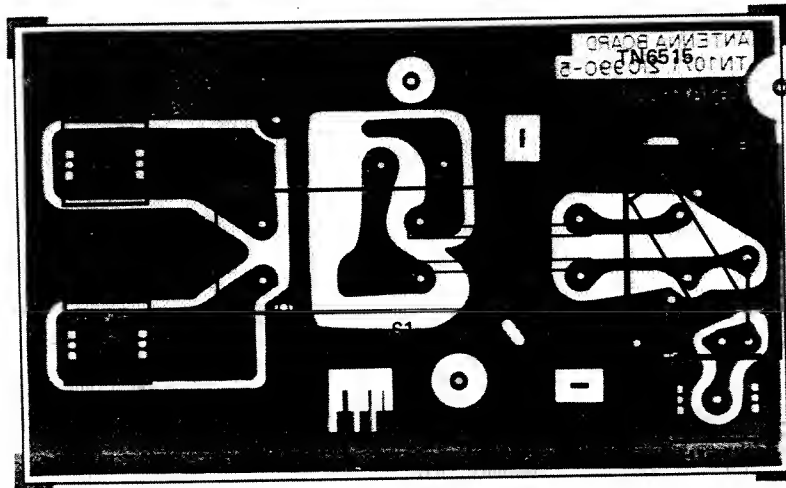
Player Hand Control Does Not Work

- a. Check to see if the Player Hand Control is properly plugged into the rear of the console.
- b. Defective Player Hand Control.

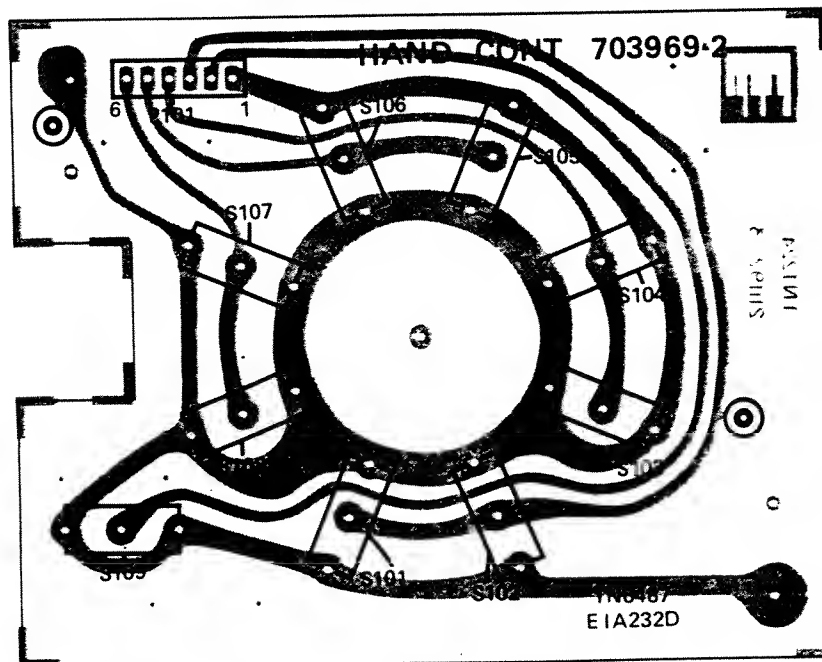
## RF MODULATOR P.C. BOARD

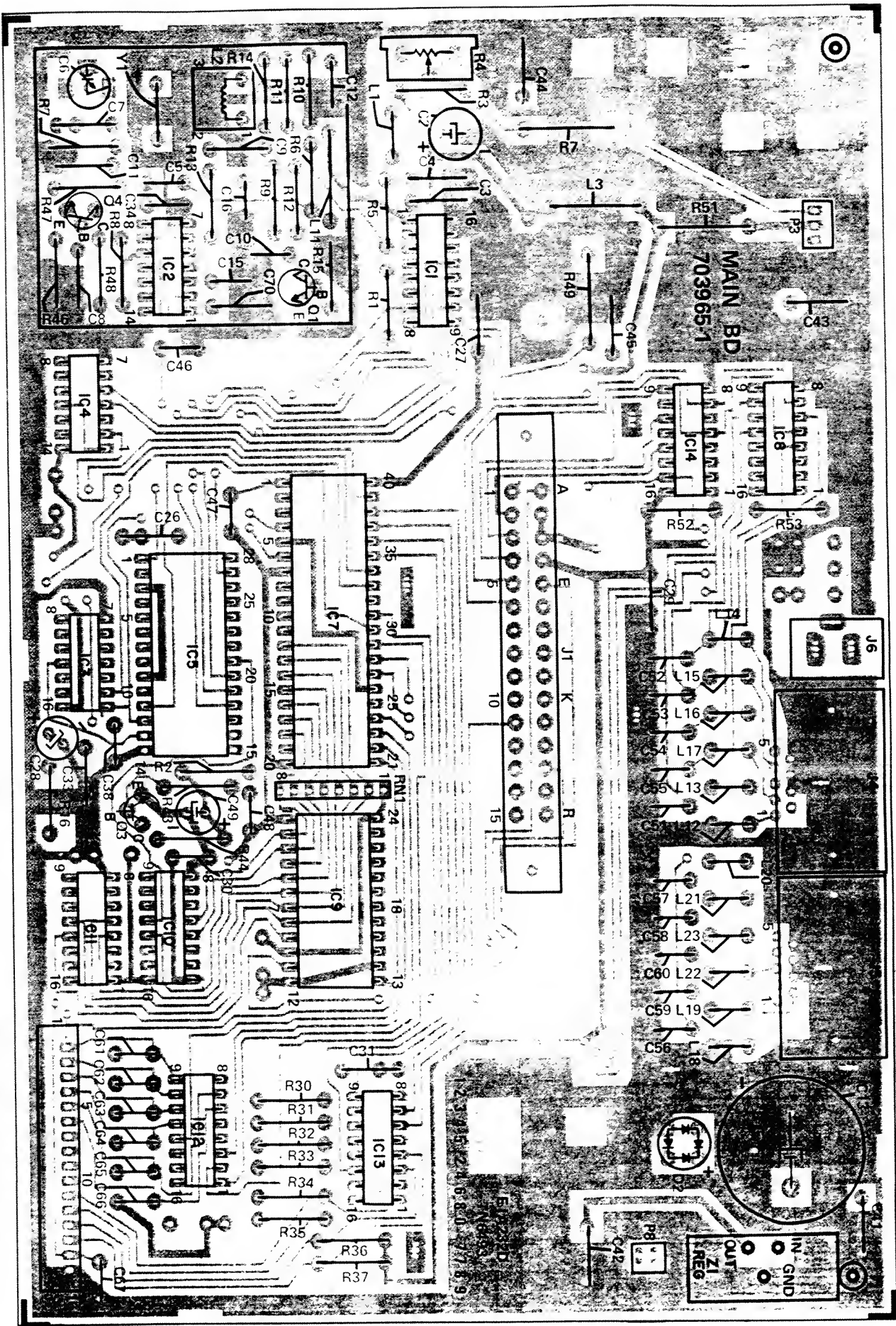


## ANTENNA/GAME SWITCH BOX P.C. BOARD

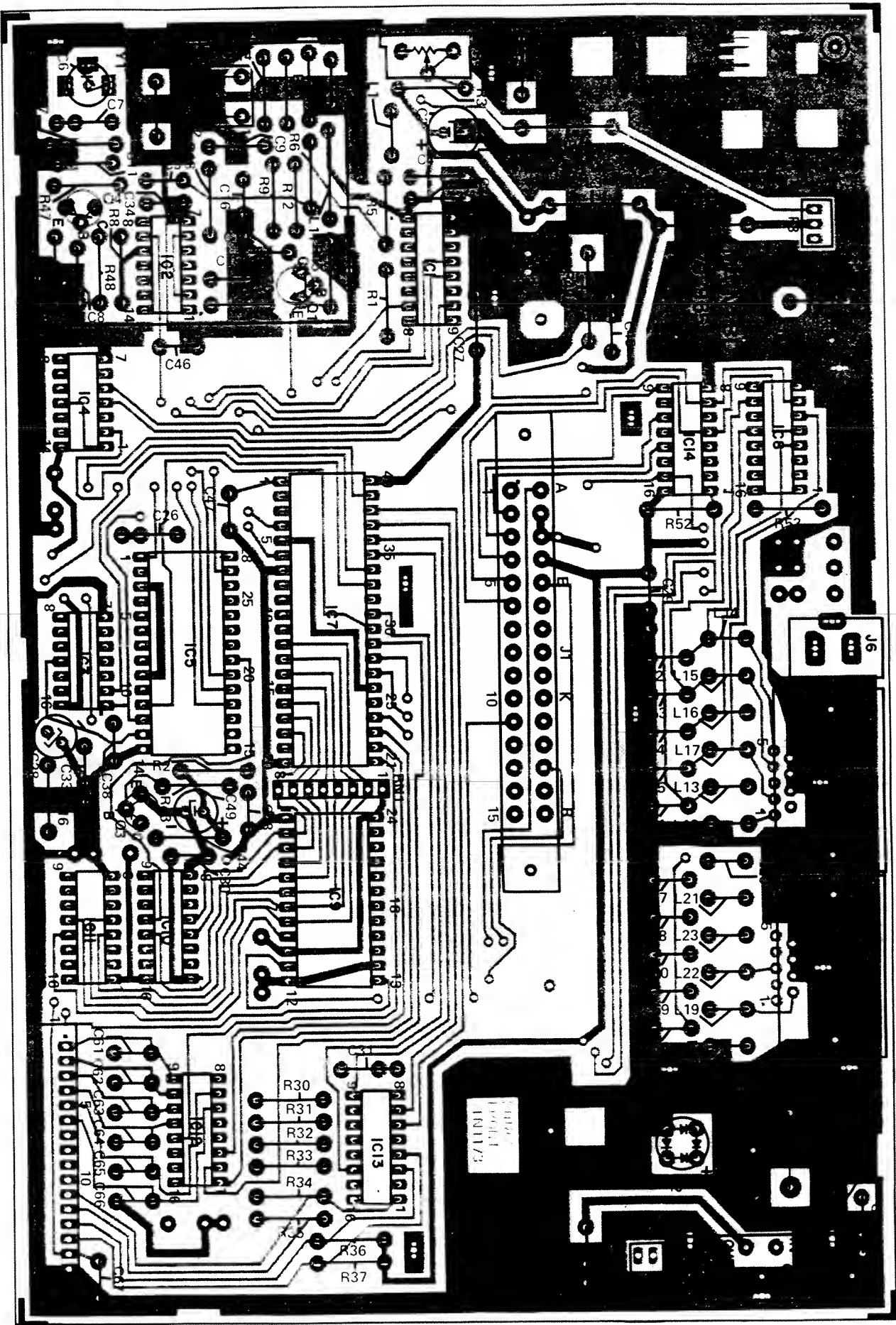


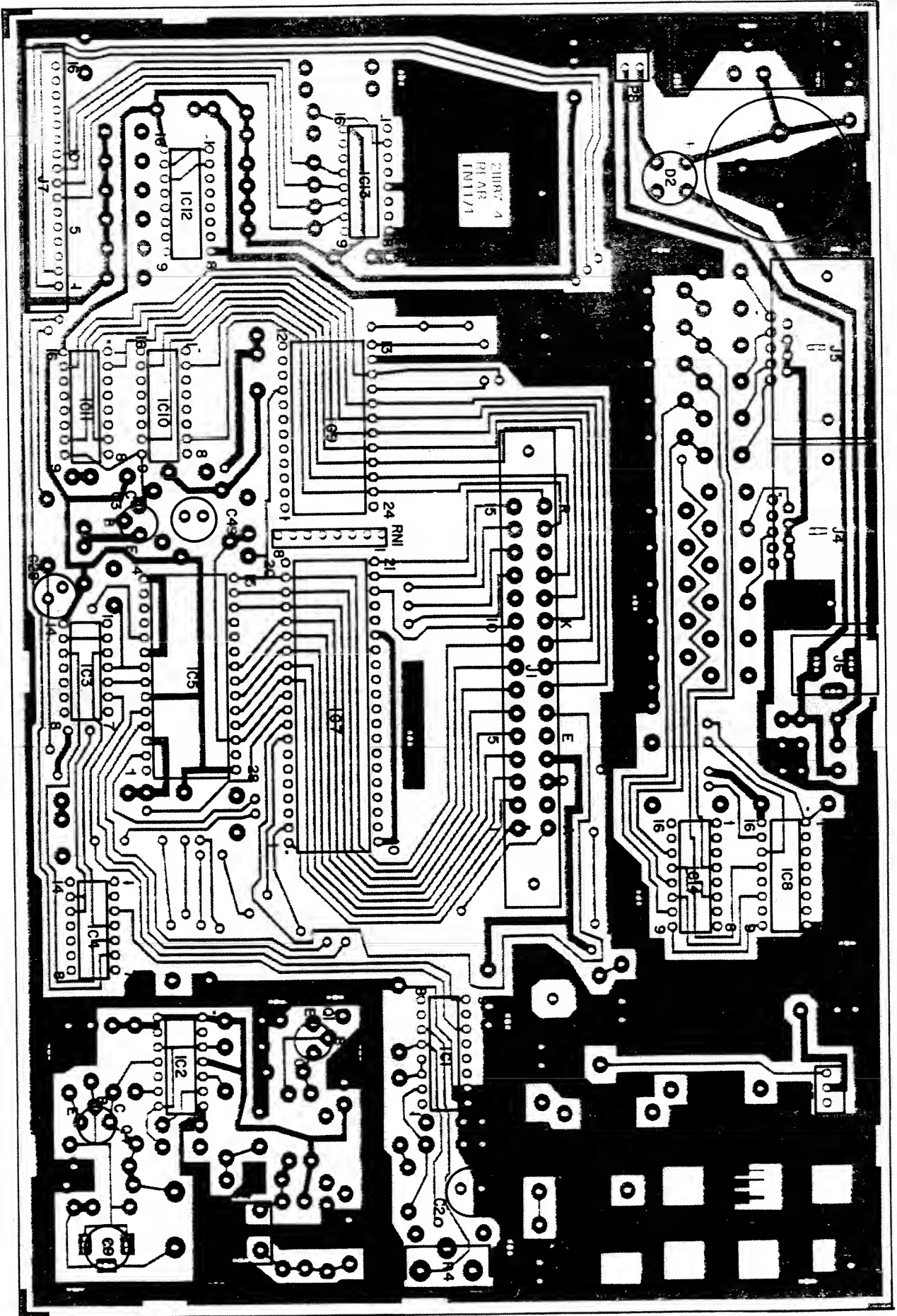
## HAND CONTROL P.C. BOARD



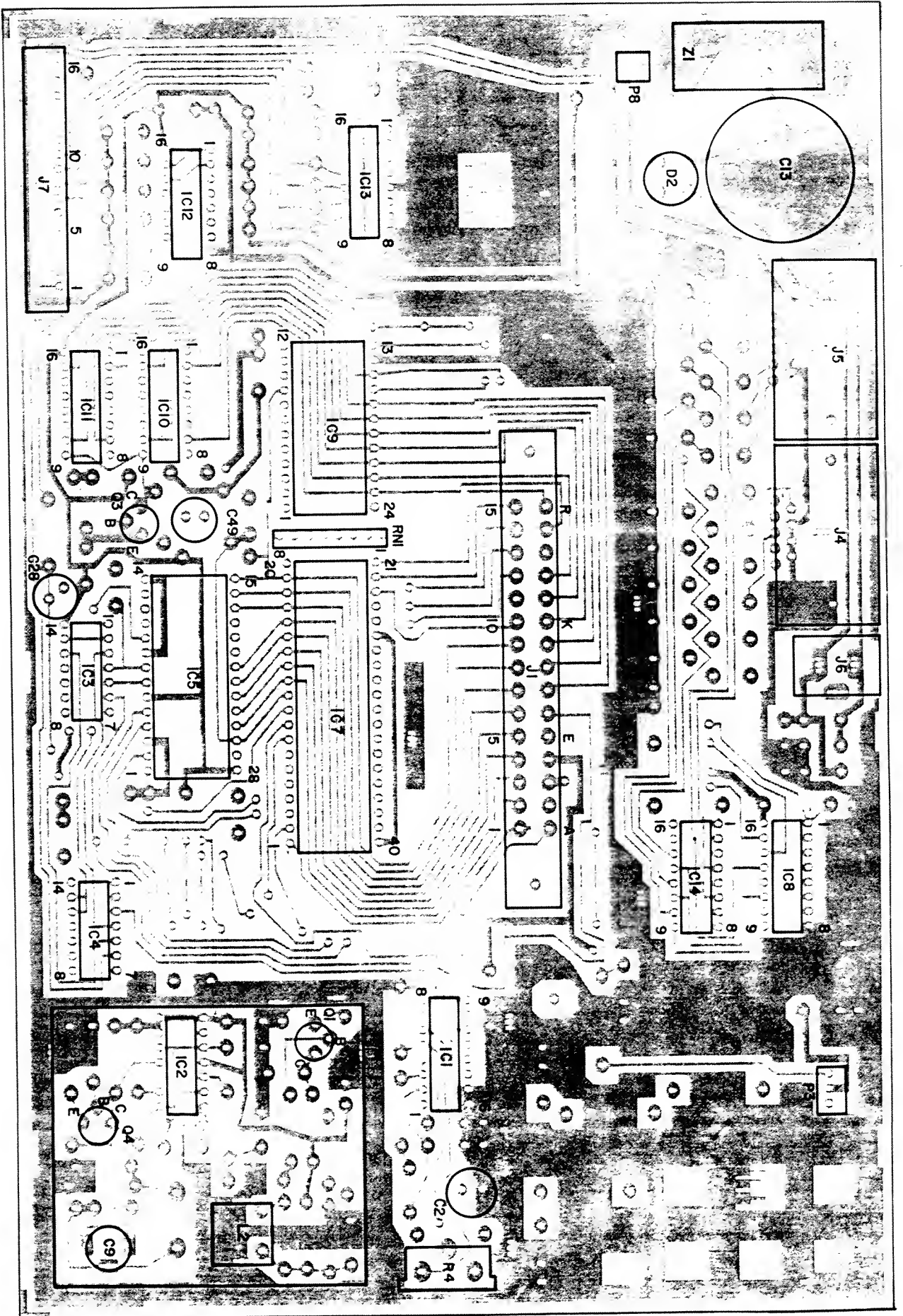
MAIN P.C. BOARD  
(TOP VIEW)



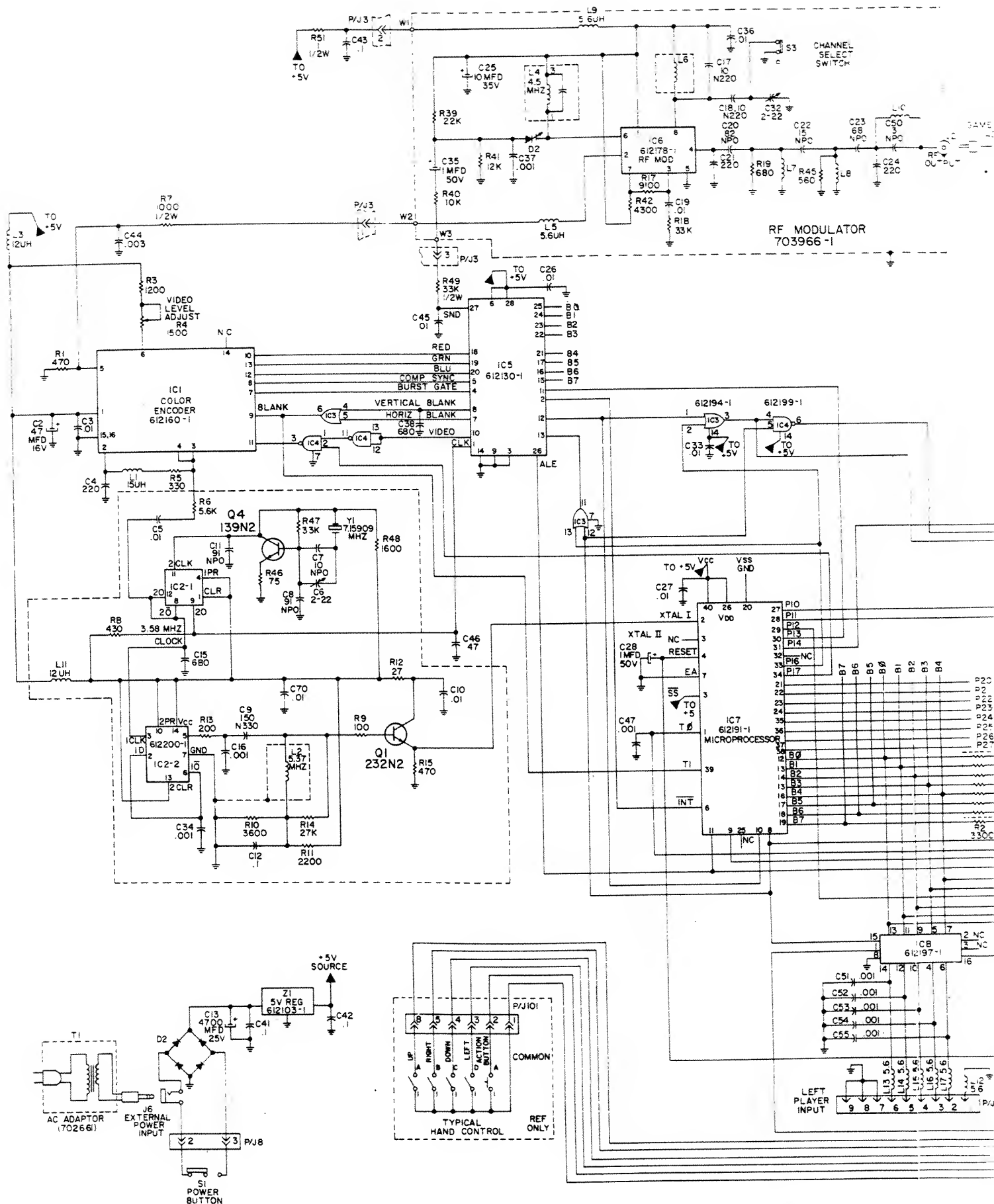
MAIN P.C. BOARD  
(TOP VIEW)

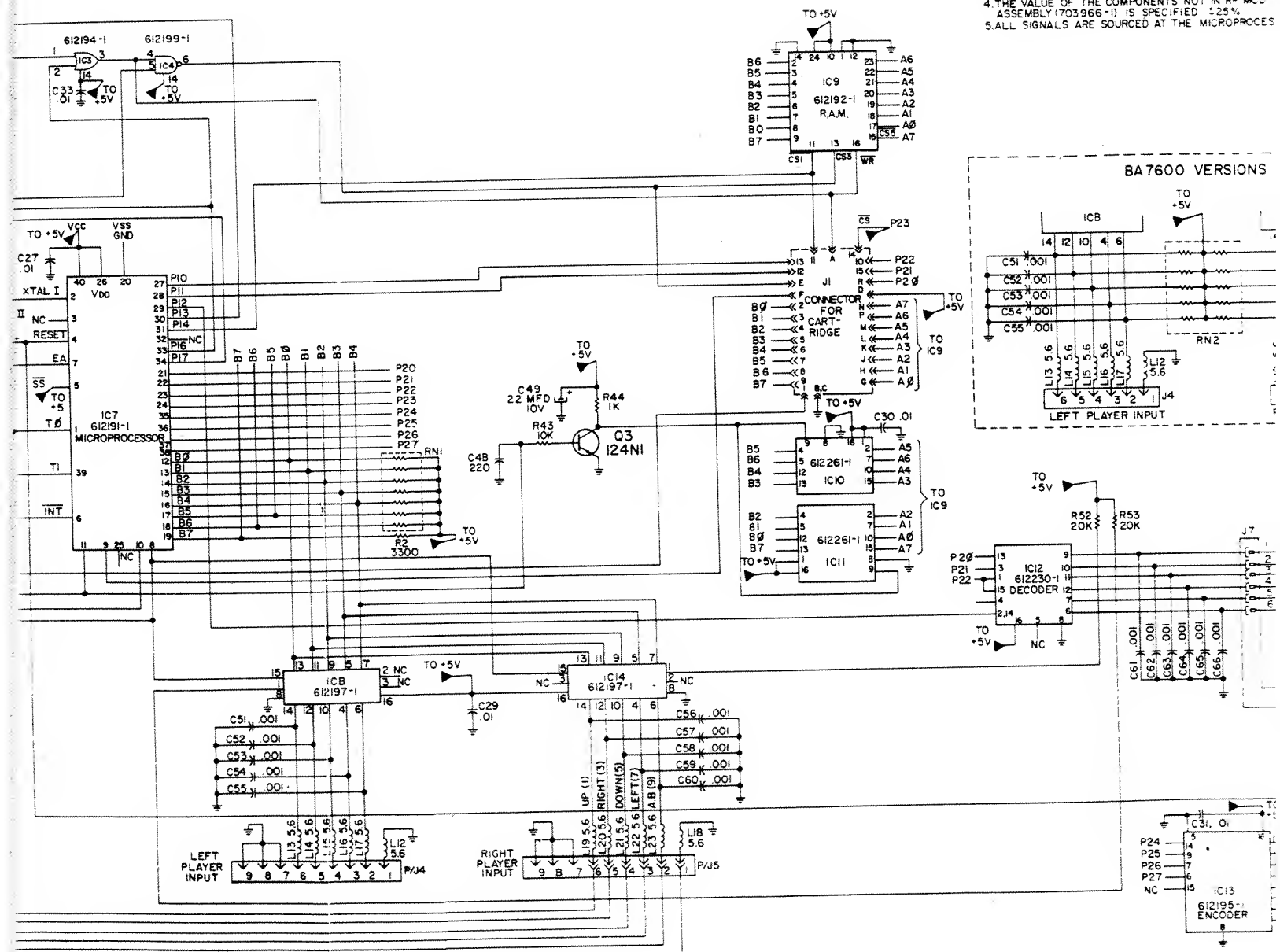
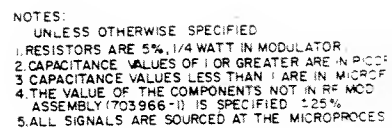
MAIN P.C. BOARD  
(BOTTOM VIEW)

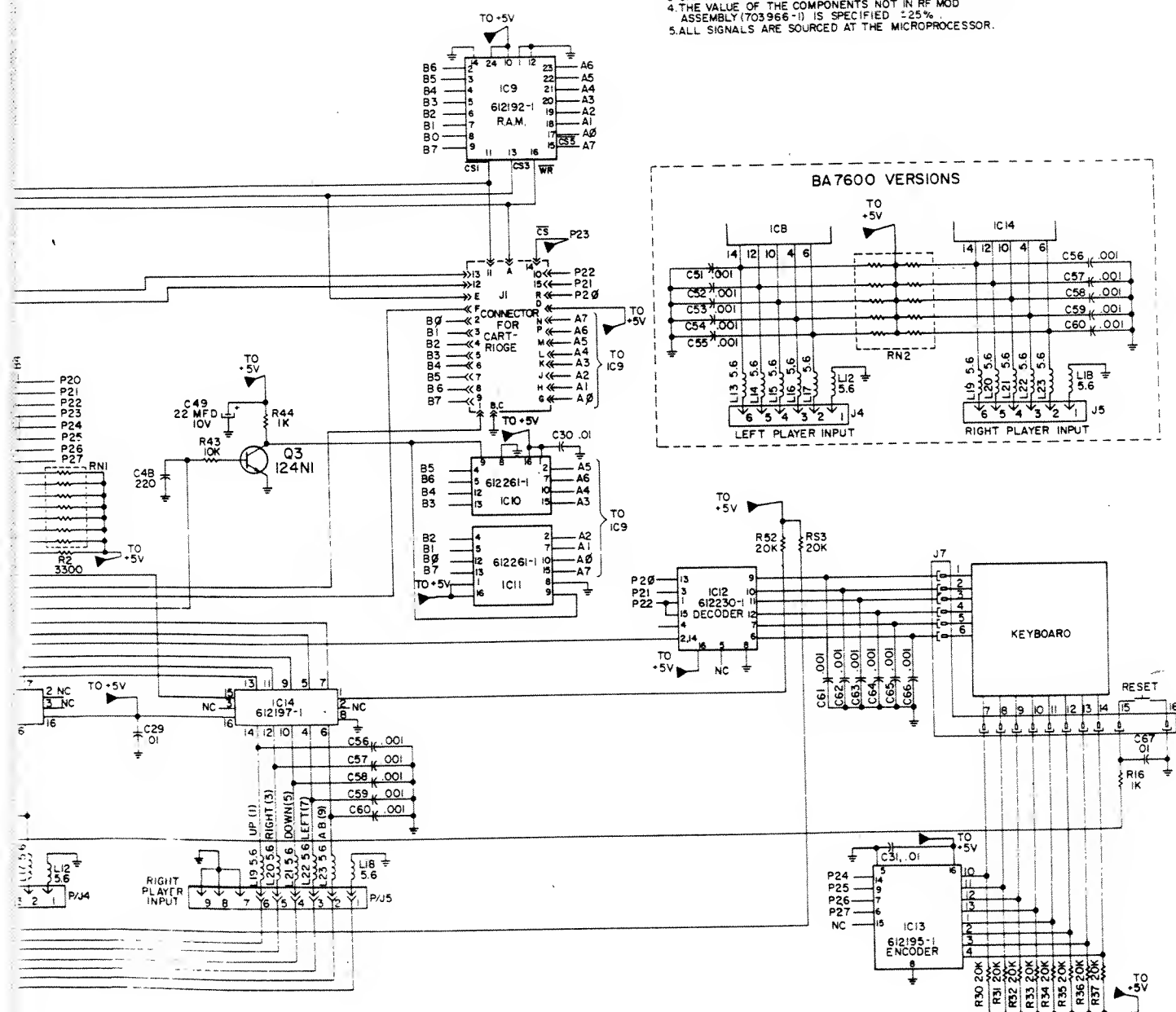
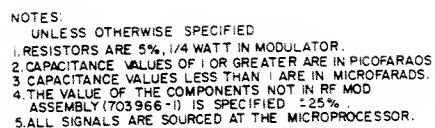
MAIN P.C. BOARD  
(BOTTOM VIEW)











**IMPORTANT**

It is against Federal Communications Commission regulations to cause any interference to nearby television sets.

- Please do not use any longer twin-lead wire from the Antenna/Game Switch Box to your TV set than is supplied.
- Please do not make a direct connection from the Antenna/Game Switch Box to any TV antenna or cable TV outlet.
- Do not attach loose wires to your TV antenna terminals when your Odyssey<sup>2</sup> is turned ON.

**703966 "RF MODULATOR" ASSEMBLY REPLACEMENT PARTS LIST**

REF.	DESCRIPTION	PART NO.	REF.	DESCRIPTION	PART NO.
	<b>COILS</b>				
L4	4.5 MHz Coil	361441-2	R17	Carbon Film, 9.1K ohm, 5%, 1/4W	230214-9125
L5	Peaking Coil, 5.6 uh	361444-5690	R18	Carbon Film, 33K ohm, 5%, 1/4W	230214-3335
L6	Coil	361398-22	R19	Carbon Film, 680 ohm, 5%, 1/4W	230214-6815
L7	Filter Coil	361558-4	R39	Carbon Film, 22K ohm, 5%, 1/4W	230214-2235
L8	Filter Coil	361558-4	R40	Carbon Film, 10K ohm, 5%, 1/4W	230214-1035
L9	Peaking Coil, 5.6 uh	361444-5690	R41	Carbon Film, 12K ohm, 5%, 1/4W	230214-1225
L10	Filter Coil	361558-4	R42	Carbon Film, 4.3K ohm, 5%, 1/4W	230214-4325
	<b>CAPACITORS</b>		R45	Carbon Film, 560 ohm, 5%, 1/4W	230214-5615
C17	Ceramic, 10 pf., 5%, 500V, N220	250666-1005		<b>SWITCHES</b>	
C18	Ceramic, 10 pf., 5%, 500V, N220	250666-1005	S3	Channel Select Switch	160556-2
C19	Ceramic, .01 mfd., +80-20%, 100V	250660-2009		<b>SEMICONDUCTORS</b>	
C20	Ceramic, 82 pf., 5%, 500V, NPO	250546-8205	D2	Silicon Diode	530104-2
C21	Ceramic, 220 pf., 5%, 500V	250551-2215	IC6	RF Modulator IC	61217B-1
C22	Ceramic, 15 pf., 5%, 500V, NPO	250546-1505		<b>MISCELLANEOUS</b>	
C23	Ceramic, 68 pf., 5%, 500V, NPO	250546-6805	J2	RF Output Jack	181095-1
C24	Ceramic, 220 pf., 5%, 500V	250551-2215	J3	3 Pin Connector	181252-3
C25	Electrolytic, 10 mfd., 35V	270109-1135		Shield (f/L6)	636734-30
C32	Trimmer, 2-22 pf.	260220-5		RF Module Box	733292-1
C35	Electrolytic, 1 mfd., 50V	270109-1050		Bottom Shield	733293-6
C36	Ceramic, .01 mfd., +80-20%, 100V	250660-2009		Top Shield	733293-7
C37	Ceramic, .001 mfd., 20%, 500V	250554-1020			
C50	Ceramic, 3 pf., ± 1 pf., 500V, NPO	250546-3096			

**702669 "CONSOLE" UNIT REPLACEMENT PARTS LIST**

REF.	DESCRIPTION	PART NO.	REF.	DESCRIPTION	PART NO.
J8	Connector (f/Power Button)	181252-2403		Foot, 4 used	141737-3
S1	Power Button	160590-3		Game Cord Assembly	461218-7
	Knob (f/Power Button)	144132-1		—Plug (Inserted into Ant/Game Switch Box)	180903-1
	Keyboard	160624-101		—Plug (Inserted in Console Unit)	181235-9
	Cabinet Top	144087-1		—Cable	461263-1
	Cabinet Bottom	144088-3		AC Adaptor (BJ7600 only)	702661-1
	Keyboard Frame	144089-1		AC Adaptor (BK 7600 only)	702661-2
	Case Overlay	151649-1			

**702667 "PLAYER HAND CONTROL" REPLACEMENT PARTS LIST**

REF.	DESCRIPTION	PART NO.	REF.	DESCRIPTION	PART NO.
	Case Top	144093-3		Hand Control P.C. Board Assembly	703969-2
	Case Bottom	144094-1		—6 Pin Wafer Assembly	181253-6
	Joy Stick	733300-3		—Momentary Switch Button, 9 used	160599-1
	Joy Stick Knob	143977-2		—Momentary Switch, 8 used	160599-6
	Joy Stick Retainer	143975-2		—Momentary Switch	160599-7
	Cover	144082-2		Spring Actuator	733497-1
	Actuator Plate	144083-1		Pin Spring	733305-1
	Action Button	144098-1			
	Oirt Shield	644395-1			
	Cable Assembly	702597-2			
	—9 Pin Housing, J101	181305-1			
	—Connector, P4/P5	181252-6			
	—Cable Guard	144177-1			
	—Strain Relief Clip, 2 used	103383-1			
	—Contacts, 6 used	181306-1			
	—Contacts, 3 used	181306-2			
	—Flat Cable	461281-4			

## 703965 "MAIN" P.C. BOARD ASSEMBLY REPLACEMENT PARTS LIST

REF.	DESCRIPTION	PART NO.	REF.	DESCRIPTION	PART NO.
COILS					
L1	Peaking Coil, 15 uh	361475-150	R13	Carbon Film, 200 ohm, 5%, 1/4W	230214-2015
L2	5.37 MHz Coil	361441-7	R14	Carbon Film, 27K ohm, 5%, 1/4W	230214-2735
L3	RF Choke Coil, 12 uh	360676-25	R15	Carbon Film, 470 ohm, 5%, 1/4W	230214-4715
L11	RF Choke Coil, 12 uh	360676-25	R16	Carbon Film, 1K ohm, 5%, 1/4W	230214-1025
L12-23	Peaking Coil, 5.6 uh	361444-5690	R30	Carbon Film, 20K ohm, 5%, 1/4W	230214-2035
CAPACITORS			R31	Carbon Film, 20K ohm, 5%, 1/4W	230214-2035
C2	Electrolytic, 47 mfd., 16V	270109-5115	R32	Carbon Film, 20K ohm, 5%, 1/4W	230214-2035
C3	Ceramic, .01 mfd., +80-20%, 100V	250660-2009	R33	Carbon Film, 20K ohm, 5%, 1/4W	230214-2035
C4	Ceramic, 220 pf., 5%, 500V	250551-2215	R34	Carbon Film, 20K ohm, 5%, 1/4W	230214-2035
C5	Ceramic, .01 mfd., +80-20%, 100V	250660-2009	R35	Carbon Film, 20K ohm, 5%, 1/4W	230214-2035
C6	Trimmer, 2-22 pf.	260220-5	R36	Carbon Film, 20K ohm, 5%, 1/4W	230214-2035
C7	Ceramic, 10 pf., 10%, 500V, NPO	250546-1009	R37	Carbon Film, 20K ohm, 5%, 1/4W	230214-2035
C8	Ceramic, 91 pf., 5%, 500V, NPO	250546-9105	R43	Carbon Film, 10K ohm, 5%, 1/4W	230214-1035
C9	Ceramic, 150 pf., 10%, 500V, N330	250528-1519	R44	Carbon Film, 1K ohm, 5%, 1/4W	230214-1025
C10	Ceramic, .01 mfd., +80-20%, 100V	250660-2009	R46	Carbon Film, 75 ohm, 5%, 1/4W	230214-7505
C11	Ceramic, 91 pf., 5%, 500V, NPO	250546-9105	R47	Carbon Film, 33K ohm, 5%, 1/4W	230214-3335
C12	Mylar, .1 mfd., 10%, 50V	250642-1049	R48	Carbon Film, 1.6K ohm, 5%, 1/4W	230214-1625
C13	Electrolytic, 4700 mfd., 25V	270132-5	R49	Carbon Film, 33K ohm, 5%, 1/4W	230212-3335
C15	Ceramic, 680 pf., 20%, 500V	250551-6810	R51	Carbon Film, 1 ohm, 10%, 1/4W	230212-1095
C16	Mica, 1000 pf., 10%, 100V	250607-6973	R52	Carbon Film, 20K ohm, 5%, 1/4W	230214-2035
C26	Ceramic, .01 mfd., +80-20%, 100V	250660-2009	R53	Carbon Film, 20K ohm, 5%, 1/4W	230214-2035
C27	Ceramic, .01 mfd., +80-20%, 100V	250660-2009	CONTROLS		
C28	Electrolytic, 1 mfd., 50V	270109-1050	R4	Video Level Adjust, 1500 ohm	220299-1522
C29	Ceramic, .01 mfd., +80-20%, 100V	250660-2009	SEMICONDUCTORS		
C30	Ceramic, .01 mfd., +80-20%, 100V	250660-2009	Q1	NPN Silicon	610232-2
C31	Ceramic, .01 mfd., +80-20%, 100V	250660-2009	Q3	NPN, Silicon	610124-1
C33	Ceramic, .01 mfd., +80-20%, 100V	250660-2009	Q4	NPN, Silicon	610139-2
C34	Ceramic, 1000 pf., 20%, 500V	250551-1020	D2	Bridge Rectifier	530204-1
C38	Ceramic, 680 pf., 20%, 500V	250551-6810	Z1	Regulator, 5 Volt	612103-3
C41	Polyester, .1 mfd., 20%, 100V	250555-184	Y1	Crystal	560404-3
C42	Polyester, .1 mfd., 20%, 100V	250555-184	IC1	Color Encoder IC	612160-3
C43	Polyester, .1 mfd., 20%, 100V	250555-184	IC2	Dual D-Type Positive-Edge-Triggered IC	612200-1
C44	Ceramic, 3000 pf., 5%, 500V	250551-3025	IC3	Quad 2 Input Positive or Gate IC	612194-1
C45	Ceramic, .01 mfd., +80-20%, 100V	250660-2009	IC4	Quad 2 Input Positive IC	612199-1
C46	Ceramic, 47 pf., 10%, 500V	250551-4709	IC5	Graphics Display IC	612130-1
C47	Ceramic, 1000 pf., 20%, 500V	250551-1020	IC7	Microprocessor IC	612191-1
C48	Ceramic, 220 pf., 10%, 500V	250551-2219	IC8	Gated Input IC	612197-1
C49	Electrolytic, 22 mfd., 10V	270109-2110	IC9	R.A.M. IC	612192-1
C51	Ceramic, 1000 pf., 20%, 500V	250551-1020	IC10	Quad Positive-Edge-Triggered D Type IC	612261-1
C52	Ceramic, 1000 pf., 20%, 500V	250551-1020	IC11	Quad Positive-Edge-Triggered D Type IC	612261-1
C53	Ceramic, 1000 pf., 20%, 500V	250551-1020	IC12	Decoder IC	612230-1
C54	Ceramic, 1000 pf., 20%, 500V	250551-1020	IC13	Encoder IC	612195-1
C55	Ceramic, 1000 pf., 20%, 500V	250551-1020	IC14	Gated Input IC	612197-1
C56	Ceramic, 1000 pf., 20%, 500V	250551-1020	MISCELLANEOUS		
C57	Ceramic, 1000 pf., 20%, 500V	250551-1020	J1	Cartridge Connector	181257-1
C58	Ceramic, 1000 pf., 20%, 500V	250551-1020	J4	Left Player Input Plug, 9-Pin (BJ7600 only)	181307-1
C59	Ceramic, 1000 pf., 20%, 500V	250551-1020	J4	Left Player Input Plug, 9-Pin (BK7600 only)	181307-3
C60	Ceramic, 1000 pf., 20%, 500V	250551-1020	J5	Right Player Input Plug, 9-Pin (BJ7600 only)	181307-1
C61	Ceramic, 1000 pf., 20%, 500V	250551-1020	J5	Right Player Input Plug, 9-Pin (BK7600 only)	181307-3
C62	Ceramic, 1000 pf., 20%, 500V	250551-1020	J6	AC Adaptor Input Jack (BJ7600 only)	181250-1
C63	Ceramic, 1000 pf., 20%, 500V	250551-1020	J6	AC Adaptor Input Jack (BK7600 only)	181328-1
C64	Ceramic, 1000 pf., 20%, 500V	250551-1020	J7	Keyboard Connector	181309-2
C65	Ceramic, 1000 pf., 20%, 500V	250551-1020	P3	3-Pin Wafer Assembly	181254-3
C66	Ceramic, 1000 pf., 20%, 500V	250551-1020	P8	2-Pin Wafer Assembly	181254-2
C67	Ceramic, .01 mfd., +80-20%, 100V	250660-2009		IC Socket (f/IC5)	181214-1
C70	Ceramic, .01 mfd., +80-20%, 100V	250660-2009		IC Socket (f/IC7)	181214-2
RESISTORS				Heat Sink (f/Z1)	733539-1
RN1	Resistor Network	254003-3325		Heat Sink (f/Z1)	733540-1
R1	Carbon Film, 470 ohm, 5%, 1/4W	230214-4715		Shorting Clip	733683-1
R2	Carbon Film, 3.3K ohm, 5%, 1/4W	230214-3325			
R3	Carbon Film, 1.2K ohm, 5%, 1/4W	230214-1225			
R5	Carbon Film, 330 ohm, 5%, 1/4W	230214-3315			
R6	Carbon Film, 5.6K ohm, 5%, 1/4W	230214-5625			
R7	Carbon Film, 1K ohm, 5%, 1/4W	230212-1025			
R8	Carbon Film, 430 ohm, 5%, 1/4W	230214-4315			
R9	Carbon Film, 100 ohm, 5%, 1/4W	230214-1015			
R10	Carbon Film, 3.6K ohm, 5%, 1/4W	230214-3625			
R11	Carbon Film, 2.2K ohm, 5%, 1/4W	230214-2225			
R12	Carbon Film, 27 ohm, 5%, 1/4W	230214-2705			

## 701702-7 "ANTENNA/GAME SWITCH BOX" ASSEMBLY REPLACEMENT PARTS LIST

REF.	DESCRIPTION	PART NO.
	Antenna Box Bottom	143674-1
	Antenna Box Top	143676-1
	Plastic Hook	143719-1
	Antenna Unit	703748-6
	-Antenna/Game Switch, S1	160499-3
	-Game Cord Socket, J1	180902-4
	-Balun Antenna, T1	361108-2
	-Terminal (2 used)	200495-1
	-Cable Assembly, Twin Lead	782237-2
	-Solderless Terminal, 2 used (f/782237)	200517-1
	-300 ohm wire (f/782237)	461144-1
	-Antenna Board Shield	733573-1